

# Carnap and Rationality of Theory Choice

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**Abstract:** In this paper, one aspect of Carnap's philosophy is examined, namely the relations of Carnap's various views and the rationality of theory acceptance in science.

Irzik, Friedman and others have shown already that the so called "standard account" – presenting Carnap as an "arch rationalist"- is over-simplified. Friedman's earlier view was criticized by Irzik to be too relativistic. I agree with these critiques; however I attempt to show that even Irzik's and Friedman's later view – which converge to each other - are not adequate. Their argument based on linguistical framework is examined, but several defects are shown. I point out that linguistical frameworks can be wider and narrower, which makes the conclusion invalid. Carnap's view on theory acceptance is investigated and we find that Carnap accepted algorithmic evaluation of degree of confirmation, but rejected a binary theory choice. I argue that the reason for this is avoidance of information loss and not framework relativity. Irzik's and Friedman's term of "instrumental rationality" is analyzed, and some conceptual problems are indicated. I reason that Carnap's conventionalism has to be regarded with keeping in mind his distinction of synthetical and analytical questions.

Friedman's hierarchy of frameworks, - which he constructed as an extension of Carnap's and Kuhn's theory - is discussed, and I propose another hierarchy of frameworks and give some arguments why it is more fruitful than Friedman's.

## Re-evaluation of Carnap's philosophy

In the last decade a re-evaluation or reconsideration of logical empiricism, especially of Carnap's work has been apparent in philosophy<sup>1</sup>. Some of the key figures are Reisch<sup>2</sup>, Earman<sup>3</sup>, Friedman and Irzik. A main issue is the comparison of Carnap and Kuhn and the transition of logical empiricism to post-positivism. The mentioned authors seem to agree that the later philosophy of Carnap is closer to Kuhn than according to the so called standard account<sup>4</sup>. The standard account assumes that Kuhn "killed" logical empiricism by refuting their main theses, like reductionism, verification, atomism, logicism and an a-historical view; and justifying completely new and opposite theses, like incommensurability, holism, theory ladenness of observations, and a historical and social view.

Despite to this standard account, the re-evaluated view is that Carnap's linguistic frameworks are quite similar to Kuhn's paradigms and his view about the pragmatism of the external questions is close to Kuhn's values of theory choice. According to the re-evaluated view Carnap's theory includes some kind of incommensurability, holism, theory ladenness of observation, so his theory is quite near to Kuhn's theory of scientific revolutions, normal science and paradigms.

I also have to indicate that beside the consensus on the main topics, the views of these scholars also differ in some details, in their motivations. For example Earman's goal is a

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<sup>1</sup> As an obvious indication of these trends see the title of Friedman's book: Friedman 1999; and the title of Irzik's paper: Irzik 1999.

<sup>2</sup> See Reisch 1994.

<sup>3</sup> See Earman 1993.

<sup>4</sup> The term "standard account" is taken from Irzik 2003, and it is also portrayed there more in details.

Bayesian theory, Friedman's aim is to show the Kantian bases of Carnap's philosophy, Reisch's objective is to explain the letters of Carnap to Kuhn.

Among the differences of the views there is one, which is crucial for the topic of this paper. In almost all of these papers, when presenting Carnap's view as an almost Kuhnian view, we find the problem of rationality, which was also an inspiring problem for Kuhn and for the philosophers interpreting Kuhn.

## **Rationality of theory acceptance**

Irzik criticises the standard account, particularly Putnam's, and Kuhn's account of logical empiricism.

"Thus, Putnam, Kuhn, and others are incorrect when they claim that according to logical empiricism the scientific method exhausts rationality, at least in so far as Carnap's philosophy is concerned." (Irzik 2003, p. 335).

He also criticises Friedman's earlier view on the rationality of theory choice and his reconstruction of Carnap's view on this:

"So far, our interpretation agree; but then Friedman adds that the choice between different systems of rules and logics is purely conventional, governed by 'pragmatic - as opposed to rational – criteria', meaning that a pragmatic choice cannot be rational." (Irzik 2003, p. 333)

The above mentioned common interpretation of Irzik and Friedman is what I already described: that the standard account on Carnap's view to be "arch-rationalistic" is not precise. Friedman's paper (Friedman 1998) referred by Irzik seems to verify his claim.

In this paper one can find a claim that Carnap's view about linguistic frameworks and external questions means that there is no possibility for rational and methodological theory-choice.

"These questions cannot be rationally or objectively answerable, because the over-arching rules that could define and characterize these notions are, in this case, necessarily missing." (Friedman 1998, p. 250.).

Irzik's statement however is that Friedman presents in this paper Carnap to be too relativistic. Irzik's thesis is that Carnap's views are in between of "arch rationalist" and relativist. He denotes this special kind of rationality as instrumental rationality:

"... the adoption of a linguistic framework is instrumentally rational if it serves a predetermined goal efficiently." (Irzik 2003, p. 335.).

There is also a limit of rationality in Carnap's philosophy for Irzik:

"Thus relativizing truth and confirmation to theory language is indeed costly: Carnap cannot claim that one scientific theory is better than another on cognitive epistemic grounds." (Irzik, 2003 p. 339.).

A later paper of Friedman (Friedman 2002), written at the same time as Irzik's criticism, is very similar to Irzik's paper. It distinguishes instrumental and conversational rationality and concludes the same as Irzik: theory choice in Carnap's philosophy may be described as instrumentally rational.

"What is controversial rather, is the further idea that the scientific enterprise thereby counts as a privileged model or exemplar of rational knowledge of – rational inquiry into –nature. And the reason for this have nothing to do with doubts about the incontrovertible predicative success of

the scientific enterprise – they do not call into question, that is the instrumental rationality of this enterprise. What has been called in question, rather, is what Jürgen Habermas calls communicative rationality." (Friedman 1998., pp. 183.)

The same view can be found in Friedman 2001, especially in Lecture III. So Irzik's and Friedman's view seem to converge on this issue.

My goal in this paper is not to review Carnap's views, or their re-evaluations in general. A critique of these re-evaluations can be found in Oliveira, 2001. My aim is also not to compare Carnap's and Kuhn's philosophy. My objective is to examine one aspect of Carnap's philosophy, namely the relations of Carnap's various views and the rationality of theory acceptance in science. I will mostly focus on the argumentation of Irzik's paper, since it is more appropriate for me. I will give some counter arguments and suggest some modification of Irzik's and Friedman's view.

## **The argument based on linguistic framework relativity**

In Irzik's paper from 2003, the most important argument is rooting in Carnap's theory about linguistic frameworks as well as internal and external questions.

This argument is based on three premises. The first one is the framework-theory introduced by Carnap in „ Empiricism, Semantics, and Ontology”. Here Carnap presents the distinction of internal and external questions, and states that external questions are pragmatical.

"The acceptance or rejection of abstract linguistic forms, just as the acceptance or rejection of any other linguistic forms in any branch of science, will finally be decided by their efficiency as instruments, the ratio of the results achieved to the amount of complexity of the efforts required. (Carnap 1998, p. 221, I will refer to this quote as C1)

Irzik analyzes "Empiricism, Semantics, and Ontology" in Irzik 2003 pp. 333-334, Friedman 2001 for example on p. 17-18.

The second premise can be represented by a part from Carnap 1963, which is quoted for example by Reisch<sup>5</sup> when comparing the linguistic frameworks of Carnap with the paradigms of Kuhn. Irzik refers to this in Irzik 2003, p. 331.

"... a change in language, and a mere change in or addition of, a truth-value ascribed to an indeterminate statement. ... A change of the first kind constitutes a radical alteration, sometimes a revolution, and it only occurs at certain historically decisive points in the development of science. ... A change of the first kind constitutes, strictly speaking, a transition from a language  $L_n$  to a new language  $L_{n+1}$ . (Carnap 1963, page 921 I will refer to this quote as C2).

The third assertion is that the external, pragmatical questions may only be rational in the instrumental sense. This seems to be included in the quote of C1. Carnap does not use the term "instrumentally rational", only the term "decided by their efficiency as instruments". Irzik and Friedman interpreted and named this as "instrumental rationality". I will return on these conceptual questions later.

The argument follows as this: Carnap regards the acceptance of a linguistic framework as external and pragmatical (C1). He also regards scientific revolutions going with linguistic changes (C2). Consequently, theory choice has to be external and pragmatical for Carnap, and

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<sup>5</sup> Reisch 1991.

from this it follows that it may only be instrumentally rational. The argument can be schematized as follows:

P0: External questions may only be solved in an instrumentally rational way. (assertion of Irzik and Friedman)

P1: Accepting a linguistic framework is an external question (C1)

P2: Scientific revolutions go with linguistic framework changes (C2)

Consequently: Theory acceptance may only be instrumentally rational.

## **Carnap's concept of language**

First I try to examine and reconstruct some relevant views of Carnap on language and linguistic frameworks in „The logical syntax of language” (Carnap 2002 (1937), henceforth "Syntax") and in later works.

For the beginning I quote a part of Syntax where Carnap states:

"Whether in the construction of a language S we formulate only L-rules or include also P-rules, and, if so, to what extent, is not a logico-philosophical problem, but a matter of convention and hence, at most, a question of expedience. If P-rules are stated, we may frequently be placed in the position of having to alter the language; and if we go so far as to adopt all acknowledged sentences as valid, then we must be continuously expanding it." (Carnap 2002, p. 180, I refer to this quote as C3)

In this paragraph Carnap contemplates about the extent of the definition, i.e. how narrow or how wide should be a language defined. I will name this question in the following as the question of „the range of the definition" of the language. If the range of the definition is wide, we get a wider framework, a wider language, which means that only bigger (theory) changes are to be regarded as language changes. If the range of the definition of the language is narrower, the language is narrower, this means that smaller or fewer changes cause language changes.

Carnap states in C3 that this range of the definition is not decidable by logical analysis, it is a pragmatic choice. Moreover, the range of the definition of a language is not fixed at all: we can define wider and narrower types of languages, as it is practical for the actual question. This liberal and tolerant view is actually very similar to the famous Principle of Tolerance of Syntax.

In Syntax, among many other thesis - the thesis of the unified language of science<sup>6</sup> is also stated:

"For everyone who takes the point of view of physicalism, it follows that our Language II<sup>7</sup> forms a complete syntactical framework for science." (Syntax, p. 151, I refer to this quote as C4.)

For my argument we have to presuppose that there will always be scientific revolutions. Carnap, Friedman and Irzik would probably agree with this presupposition. Now let us compare a schematization of C4 and C2:

P3: Scientific revolutions go with linguistic framework changes (C2)

P4: There exists a universal linguistic framework for science (C4)

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<sup>6</sup> This thesis can be found in many other writings of Carnap. One book especially on this is Carnap 1995, (1934).

<sup>7</sup> Language II is the second, more powerful language defined by Carnap in Syntax.

P5: There will be always scientific revolutions. (I assume, there is a consensus on this)

This seems to be a contradiction at the first sight. The contradiction can be avoided, if the term "linguistic framework" does refer to different frameworks in the two statements, i.e. the linguistic framework in C4 is different kind than the linguistic framework in C2. This is exactly the case in my opinion.

The more accurate reconstruction of C4 is the following:

P6: There exists a universal syntactical framework for science.

So it seems that there may be more kinds of linguistic frameworks, and the syntactical framework in C4 is a wider kind of them. Indeed, if we go back to C3, Carnap admits that a linguistic framework may be wider, and narrower. According to this, we should carefully distinguish narrower and wider frameworks.

If we replace the term "linguistic framework" with the more accurate terms "syntactic framework" and "narrower framework" respectively, we can interpret Carnap's ideas in a consistent way. In the development of science the revolutionary, theoretical changes cause - because of holism - a change in meaning of words, which is a linguistic phenomenon. This can be considered as the change of the "narrower framework" (C2). On the other hand any theory of global science can be expressed in a common, wider, syntactical framework, in which the rules of logical inference are the same, and the syntax of statements is the same. This constitutes a unity of science (C4)<sup>8</sup>.

## **Critique of the argument based on linguistic frameworks**

We got to the conclusion that there are different kinds of linguistic frameworks, and therefore we have to be careful, before inferring a conclusion based on different quotes from Carnap.

It may be that the linguistic frameworks considered in C1 are not the same kind as those in C2. Because of this, Irzik's argument is questionable. We can find out quickly that the language changes in C2 are narrower linguistic changes, since they are only "alterations" caused by theory changes, ones of the many "transitions". The question to be examined is: what kind of linguistic framework is meant in C1?

Carnap (1947) deals mainly with the so called ontological questions. Such as "Are there real numbers?", "Are colors real?", and so on. Carnap analyses these questions, and shows that there are external and internal interpretations of them. These external questions are meant in C1. The frameworks considered here, are like the system of integers, the system of real numbers, the spatio-temporal system for physics, and so on (p. 212.). These are however not the narrower frameworks of scientific theories of C2, but the wider frameworks. There is no example in Carnap (1947) about theory choice or theory change. We can conclude that the assertions of C1 is probably meant only for the very wide frameworks of science. If we reformulate P1 and P2 this way we get:

P7: Accepting a wide linguistic framework is an external question.

P8: Scientific revolutions go with narrower linguistic framework changes

Now, the inference of Irzik is not valid.

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<sup>8</sup> One may argue that Carnap's thesis about the universal language of science has failed. I do not have the possibility to go in a deeper analysis about this. I only used this to illustrate the conclusion about the importance of distinguishing between narrower and wider frameworks, which is true in my opinion independently from the question of unified language.

There are more problems with the Irzik's inference in my opinion. In P8 (C2) Carnap writes only about language change; however, in P7 (C1) about totally accepting or rejecting a language. This difference makes the inference also questionable.

Irzik himself refers to the Principle of Tolerance on the bottom of page 331 of Irzik 2003. In my opinion this tolerant and liberal handling of linguistic framework is exactly, what makes Irzik's argument questionable, since the linguistic frameworks are not fixed, so the arguments about one kind of frameworks is not necessarily valid for others.

As a summary, I think that the argument of Irzik and Friedman does suffer from three problems: (i) Scientific revolutions do not necessarily go with linguistic change. (ii) If they go with a linguistic change, this is a question of changing the language, not of accepting a total language. (iii) The linguistic framework, which may change with a scientific revolution, is not necessarily the kind of wide linguistic framework, which Carnap states to be external, but a narrower one.

## **Rationality and conventionalism**

There is still another problem in the logic of the argument. To show this, I take an example from Carnap 1995a.

"It may recalled that, in our previous discussion of the flat world, we imagined two physicists who held two different theories about the nature of the world. It became apparent that these two theories were really equivalent, differing only in that they were two different ways of describing the same totality of facts. The same situation holds with respect to relativity theory. One description, which we will call T, is non-Euclidean. The other, T is Euclidean. If the language of T, the non-Euclidean language is chosen, the laws of mechanics and optics remain the same as in pre-Einsteinian physics." (Carnap 1995a, p.153.)

It is apparent that here Carnap regards Euclidean and non-Euclidean geometry as different languages. He describes here Poincare's thesis about the conventionality of choosing the geometry. For our purposes the relevant issue is that Carnap regards in this book the Einsteinian revolution as a language-change. But language change is not necessary for the theory change in this case: both theories may be formulated in both languages, as Carnap states.

We cannot state that Carnap asserts scientific revolutions necessarily causing linguistic framework change. Reformulating again the assertions we get:

P7: Accepting a wide linguistic framework is an external question.

P9 Scientific revolutions may go with narrower linguistic framework changes, but may also be done without linguistic changes.

This way the premises of Irzik's conclusion are even weaker.

Theories and linguistic frameworks are not tied together so much as it would be needed for Irzik's argument. The relation of linguistic frameworks and theories are very complicated, especially in the case of Carnap's work, where linguistic frameworks are handled in a liberal way.

Moreover, we have in the quotation above (Carnap 1995a, p. 153.) an assertion of the possibility of commensurability: "these two theories were really equivalent".

"On the other hand, if we are dealing with the space of our universe, a space we cannot observe as something embedded in the space of a universe of higher dimension, then it is meaningless to ask whether space

is non-Euclidean or whether our laws have to be modified to preserve Euclidean geometry. The two theories are merely two descriptions of the same facts. We can call them equivalent expression because we make exactly the same prediction about observable events in both theories". (Carnap 1995a, p. 150.)

Now, in this case of equivalent theories, the decision on the language is completely conventional, but also completely without synthetical content. So the deliberation about it in terms of which is the true one is meaningless for Carnap. This is exactly, what Carnap describes as one kind of meaningless, metaphysical questions.

If we generalize this, it may be that the decision about a conventional component in a theory may not be decided rationally by a logico-empirical method, but it has also no synthetical content, so it is theoretically meaningless for Carnap. This would not be a defect of rationality in Carnap's view, since we do not expect from philosophy or science to decide theoretically meaningless questions rationally.

We arrive here to Carnap's distinction on synthetical and analytical questions. There may be a question of choosing very wide parts of linguistic frameworks, which are purely analytical matters. Carnap is conventionalist in this respect: one can choose whatever analytical definitions. But this is completely rational, since these decisions are not concerning the synthetical part, they mean nothing regarded to "reality". Regarding the choice about the synthetical part of a theory, Carnap is not conventionalist. All this is completely rational in my opinion and although conventionalist in a restricted sense, not relativist at all.

This consideration is something, which is not emphasized enough in Friedman 2001. Friedman. For example on page 72 Friedman reminds us that for Carnap "analytical sentences may be revised", moreover, there is no method for accepting constitutional frameworks. But Friedman does not emphasise that these revisions for Carnap are not refutations, but only that they are not used any more as instruments. Referring to Friedman's preferred historical example: Einstein did not refute Euclidean geometry, he only used a different geometry.

One does not have to accept a theory, but if he accepts one as true, then he shall not accept more than one; however, one has to accept a linguistic framework, moreover, one can accept more than one.

### ***Carnap on theory acceptance***

In the books of Carnap written after *Syntax* (Carnap 1947-1966), we can find a focus on semantics and on inductive method.

"I agree that there cannot be an inductive machine if the purpose of the machine is to invent new theories. I believe, however, that there can be an inductive machine with much more modest aim. Given certain observations  $e$  and hypothesis  $h$  (...), then I believe it is in many cases possible to determine, by mechanical procedures, the logical probability, or degree of confirmation, of  $h$  on the basis of  $e$ ." (Carnap 1995a, p. 34)

It seems that Carnap clearly connects the inductive method with confirmation theory, but this does not solve decisively the question of theory acceptance: Carnap does not state explicitly that the theory with higher degree of confirmation has to be accepted.

In Carnap 1966 (1962), one of Carnap's later papers, the questions of theory acceptance is discussed explicitly. The discussion is mainly focused on the dispute with Popper's

methodology based on empirical content.<sup>9</sup> Carnap tries to clarify the situation, and arrives at a possible methodology, which takes also confirmation and empirical content as a basis of theory choice. Later, Carnap's conclusion is that a measure called utility or gain is decisive when making a choice on practical questions.<sup>10</sup>

"Then X should accept as a basis for his adjustment of the apparatus that hypothesis for which the expectation value of the gain is maximum."  
((Carnap 1966, (1962), p. 259.))

This seems to be a quite explicit algorithm for theory acceptance in practical questions. All the discussion gives no explicit account on language relativity, it seems to be global and language independent.

Nevertheless, for purely theoretical questions Carnap seems not to adopt a global methodology of theory choice. However, the reason is not linguistic relativity. Rational theory choice would be possible for Carnap, but he argues that it is not needed to make a choice. A binary decision would mean information loss, and should not be done, if it is not needed. Not to choose is more rational in this case. After all, we can not state that theory acceptance was relative for Carnap, but that he rejected the question of theory choice at all.

"Among the given hypotheses  $h_1$ ,  $h_2$ , etc., I chose the hypothesis  $h_1$ ,' it would be better to say: 'I assign to the hypothesis  $h_1$  a high probability' (and if in more exact terms: 'the probability with the numeric value  $h_1$ ), 'to the hypothesis  $h_2$  a smaller probability' (and again if possible: 'the numerical value  $q_2$ ), and so on. For X to pick up one of the hypotheses and to declare that he accepts it would give only a crude indication of the knowledge that X possesses with respect to the matter in question."  
(Carnap 1966, (1962), p. 259)

We can find this same view also in Carnap 1962 (1950).

As a conclusion on this chapter I can summarize that Carnap formulates in one of his very late papers an explicit algorithm of theory choice for practical questions. For theoretical questions he draws a possibility of such an algorithm, but chooses not to choose a theory. The reason for this is not relativity, not linguistic frameworks, but simply information loss. Moreover I think, this is not a defect of rationality, but aims for higher rationality.

Carnap accepts acceptance of frameworks, since it is needed; but rejects acceptance of theories, since that is not necessary. Therefore the question of theory acceptance is not valid for Carnap, and he gives quite a rational argument for this. That is why he does not present an algorithm for it: it is not needed.

## Conceptual questions

Irzik distinguishes between theoretical versus instrumental rationality (Irzik 2003, p.342). He also distinguishes between internal versus external justification, as well as between validation and vindication (Irzik 2003, p.332). He also mentions algorithmic computability (Irzik 2003, p.327) and methodological rationality (Irzik 2003, p. 326). Internal and external questions, pragmatic and theoretical questions are also distinguished by Carnap in Carnap 1988 (1947). Irzik seems to consider all of these dualistic distinctions to be equivalent. So for Irzik, it seems, that internal justification is equal with algorithmic computability, methodological rationality, theoretical rationality, and these cover theoretical, binary questions. On the other

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<sup>9</sup> This dispute between Popper and Carnap is an interesting topic itself. But I cannot go into detailed analysis here.

<sup>10</sup> Carnap does not go here into details of difference between gain and utility. I will also not go into these details.



hand, external justification is equal with non-algorithmical, value based decisions; non-methodological choices, instrumental rationality, and these cover pragmatical questions, questions of choice, which can not be true or false. Friedman 2001 also equates all these categories on page 32. But are these categories all the same?

I will take Carnap 1988 (1947) as a basis in this chapter, and start with two quotes:

"The efficiency, fruitfulness, and simplicity of the use of the thing language may be among the decisive factors. And the questions concerning these qualities are indeed of a theoretical nature. But these questions cannot be identified with the questions of realism. They are not yes-no questions but questions of degree." Carnap (1988, p. 208)

I would like to point out one aspect from this quote: a question of degree may be a theoretical question.

"To be sure, we have to face at this point an important question; but it is a practical, not a theoretical question; it is the question of whether or not to accept the new linguistic forms. The acceptance cannot be judged as being either true or false because it is not an assertion." (Carnap 1988, p. 214)

I would like to draw attention to one particular detail from this quote: acceptance is pragmatical, not theoretical, because it is not an assertion. I would remind the reader that all this concerns linguistic frameworks, not necessarily theories.

There seems to be some contradiction between Carnap 1988 in which Carnap writes about acceptance of linguistic frameworks and Carnap 1966, where he writes about avoiding to make a choice between theories. This strengthens my remark that theses about linguistic frameworks shall not be transferred to theories, their connection is more complicated. There is also seemingly a slight contradiction in the two quotes above from Carnap 1988. In the first, Carnap states that questions of degree may be theoretical, and yes-no questions are questions of realism. The second could be interpreted as implicitly stating that questions, which are not yes-no questions, i.e. possibly questions of degree are not theoretical. But this contradicts the first quote.

To clarify this issue, one has to notice the following. There may be assertions about questions of degree. For example, the truth of the assertion about the degree of confirmation is itself a yes-no question. This way a particular assertion about a question of degree is a yes-no question, but Carnap does not consider this as a question of realism. Actually, as we know, for Carnap, the demarcation between questions of realism and other questions is the one between synthetic and analytic and not the one between binary and non-binary questions. So Carnap's argument here is not precise. A question about degree of confirmation is not synthetic, that is why it is not a question of realism.

The second quote shall be interpreted in the way that decisions are not theoretical, because they are not assertion. It is true, but irrelevant for the implication that this way they can also not be yes-no questions.

Let us analyze some cases of hypothetically possible methodologies. First, assume that we could prove theories based on an absolute set of protocol sentences. In this case the acceptance of a theory would be strictly algorithmical, and a question of true and false. Is it internal? We evaluate theories according to the protocol sentences. One could say this is an external evaluation. But since the evaluation is an inference based on given protocol sentences, probably Irzik and Carnap would categorize this case as internal.

Let us now assume another case: there is a global inductive method for computing algorithmically the degree of confirmation for all theories. We have seen that Carnap believes this. The degree of confirmation is not binary, but a question of degree. As we have seen, such

questions may be theoretical for Carnap, and confirmation - as a measure of fruitfulness - may contribute to the decision about acceptance of a theory.

Obviously, the determination of the degree of confirmation requires a framework of inductive logic, and Carnap seems not to realize here that the theory is embedded in a wider framework. Generally, Carnap does not consider the possibility of hierarchical frameworks.

In this case the computation of degree of confirmation would be theoretical, algorithmical, external to theories, but internal to the framework of inductive method.

Let us consider a methodology, which would prescribe to accept the theory, for which the degree of confirmation is the maximal. As we have seen Carnap actually accepts such a possibility, but rejected such a binary decision. Let us assume that the maximum is always unique.

In this case acceptance of theories would be pragmatical for Carnap, since acceptance is always pragmatical for him. Irzik would consider this as a theoretical-rationalist case, since the decision is algorithmical. Irzik would also take this as theoretically rational. So there is a problem here in Irzik's terminology.

Let us finally take Carnap's actual views: frameworks are accepted based on values, which are simplicity, efficiency and fruitfulness (Irzik 2003, p. 326). Irzik refers to Carnap 1988, p. 218, which states this, but only for linguistic frameworks, not for theories. Let us forget about this for a moment.

If there is a decision on theories based on more values, like for example degree of confirmation and empirical content (Carnap draws up such a possibility in Carnap 1966), then a methodology or an algorithm has to define priorities, or weights to combine the values. Until such a decision is not made about priorities or weights, there is no algorithm for decision. In this situation the decision is based on values, which are computable algorithmically, but the algorithm is not fully accomplished. So I will name it as a quasy-algorithm. This situation may be described as a pragmatical choice, which takes objective values as a base, but the priorities or weights are not laid down.

We also have to consider something what I call the "responsibility of rationality": not all decision has to be decided rationally. Carnap gives us an example that marriage has not to be decided by calculation (see Carnap 1962, page 221, quoted in Irzik 2003, p. 329). Even an "arch-rationalist" has to admit that there are decisions, which are questions of personal choice, commitment. So, if Carnap writes that some questions are pragmatical, non-theoretical, and these questions would turn out not to be answerable algorithmically, methodologically, then this would not necessarily be a more relativistic, or less rational view. It depends if they "really" have to be decided rationally, or not.

Science only has to decide questions of realism rationally. Theoretical rationality only requires that synthetical theoretical questions can be decided methodologically. Acceptance of a framework or a theory is not a question of reality for Carnap, so it does not need to be decided methodologically at all.

If equivalent theories are concerned, simplicity is not a synthetical question, and may be purely conventional. So it would even be rational, if there would no algorithm for simplicity, since it has nothing to do with the synthetical content of the theory.

To conclude this chapter, my claim is that there are some conceptual problems with the term "instrumental rationalist" and "theoretical rationalist". These concepts are not adequate to describe Carnap's view in my opinion.

## **Hierarchy of Frameworks**

I already described how Friedman's opinion regarding Carnap's view developed from the claim that rationality is not possible (Friedman 1998), to accepting a possibility of instrumental rationality (Friedman 2002).

In this later paper Friedman's view developed even further to save a possibility for a conversational rationality by a three level construction, where theories are at the first level, paradigms or frameworks at the second for instrumental rationality, and philosophy or meta-frameworks at the highest, for conversational rationality.

"At the next or second level are the constitutively a priori principles that define the fundamental spatio-temporal framework within which alone the rigorous formulation and empirical testing of first or base level principles is then possible. These relativized a priori principles constitute what Kuhn calls paradigms: relatively stable rules of the game, as it were, that make possible the problem-solving activities in normal science – including, in particular the rigorous formulation and testing of properly empirical laws. (...) And here our third level, that of philosophical meta-paradigms or meta-frameworks, plays an indispensable role, by serving as a source of guidance or orientation in motivating and sustaining the transition of one paradigm or conceptual framework to another." (Friedman 1998, pp. 189.)

I agree that by extending Carnap's philosophy of linguistic frameworks, a possibility of hierarchical structure of frameworks is possible. Friedman defines the third level as a philosophical framework, serving for conversational rationality.

I would construct the hierarchy as follows. The framework of a big scientific theory can be regarded as a narrower linguistic framework. When a big theory change occurs, the meaning of some words may be changed radically, which is a linguistic phenomena. That is the reason why it seems to be plausible to call it a language change in a narrower sense.

There are also larger frameworks, for example there is one, which defines the values and methods of unified science. This framework defines methodological rules of scientific research, rules of theory acceptance, and a common syntactical framework with concepts like "better theory", "degree of confirmation" and so on.

This way Carnap's statement is right: all these concepts are not defined in the narrower framework and external to it.

However, these concepts can be defined in the wider framework, changing them internal. This also means that the concepts "external" and "internal" are framework-relative: a question may be external to a narrower framework; but internal to a wider framework

But what about rationality? A quite strong kind of rationality can be saved. Since a very wide framework defines actually what science is. There may be disciplines outside this wide framework, but they are not sciences. So theory choice can be rational in science: we first have to accept to do science and accept a framework of theory choice.

It seems that there are widest frameworks, without any wider frameworks including them. Like the framework of science, or the framework of art. The acceptance of such a big framework may be not internal to any framework. One can decide to make science, make art, make sport, make love or choose all of them; this is a personal, subjective decision. I think this does not mean relativity as opposed to rationality.

I do not state that this was the view of Carnap. There is no explicit evidence of such a hierarchy of framework's. Unfortunately Carnap did not draw up such a construction. But this is a consistent extension, moreover rationality can be also saved.

The difference between my hierarchy and Friedman's hierarchy is that first, I argue for a stronger rationality for science; second, my hierarchy does not have strict levels: the narrower and wider frameworks are a question of the range of the definition of the linguistic framework, which may be arbitral and gradual.

My version of the hierarchy is a possibility of several narrower and wider frameworks, which may be embedded in each other. To decide a question rationally, we need a framework so

wide that the question is internal to that. Every theoretical question can be decided this way. There are widest framework, like art and science, but you do not need to make a decision between them, and the decision is not a theoretical question.

## Conclusions

I can agree fully with Irzik on one statement on Carnap: "...the complexity of his views about justification makes it difficult to label him" (Irzik 2003, p. 326). Carnap's view departs quite interestingly from the classical rationalist-relativist debate. The classical view is surely oversimplified as Irzik shows it. So is the relativist view of Friedman 1998. I think however that the picture Irzik presents is also not complete, nor Friedman 2001 and 2002.

I argued that Irzik's and Friedman's term "instrumental rationalist", as opposed to "theoretical rationalist" has some problems and in my opinion is not adequate to describe Carnap's view. Although I think Irzik's and Friedman's descriptions add to the previous picture about Carnap. To be honest, it seems that Carnap's view were not complete themselves. It seems to be worth to extend his view with the possibility of hierarchically embeddable wider and narrower frameworks as Friedman does it. I proposed a different kind of hierarchy, which is more rational in my opinion and closer to Carnap's views. One would probably think that this leads to relativity of the construction, but actually I argued for a hierarchy, which establishes rationality, since the external questions of a narrower framework may be internal to the wider one.

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